

REMARKS/ARGUMENTS

Claims 1–29, 31–44, 51, 53, and 55–100 are pending in the above-captioned application. Claims 1–4, 6, 8–29, 31–44, 51, 53, 55–79, 81, and 83–100 stand rejected, and claims 5, 7, 80, and 82 are withdrawn from consideration. With this paper, claims 1, 10, 39, 42, 51, and 93 have been amended. No new matter was added with the amendment.

I. Election/Restrictions

In the present Office action, the Examiner states (emphasis added), “This application contains Claims 5, 7, 80, 82 are drawn to an invention nonelected with traverse in Paper No. 4/28/2006. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.” Applicants request clarification of this statement.

In Applicants’ response of April 28, 2006, Applicants elected without traverse to prosecute the invention of Group I (claims 1–44 and 51–93), electing the species heparin sulfate from the subgenus polyanionic polymers. As stated by the Examiner in the Office action dated July 24, 2006, claims 45–50 were withdrawn as being drawn to a nonelected invention, while claims 5, 7, 80, and 82 were withdrawn as being drawn to a nonelected species. The Office action dated April 20, 2006, requiring restriction of the claims, includes the following text on page 5: “Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations of an allowable generic claim as provided by 37 CFR 1.141.” Claims 5 and 7 depend from and require all the limitations of claim 1. Claims 80 and 82 depend from and require all the limitations of independent claim 51. Therefore, it appears to Applicants that claims 5, 7, 80, and 82 should be eligible for reconsideration upon allowance of a generic claim, i.e., independent claim 1 with respect to claims 5 and 7, and independent claim 51 with respect to claims 80 and 82. Applicants do not understand why they are now being required to cancel these claims. Claims 45–50, which were drawn to a nonelected invention, were canceled in Applicants’ previous Office action response, dated December 21, 2006.

II. Claim rejections under 35 U.S.C. § 112, second paragraph

Claims 37–40 and 95–97 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as the invention. Each of the Examiner’s reasons for rejecting claims 37–40 and 95–97 has been addressed in the amendments to the still-pending claims.

Claims 37, 38, 95, and 96, all of which depend either directly or indirectly from claim 10, were rejected because they recite the limitation “the one or more conjugates,” while claim 10 described only “a conjugate.” Applicants have amended claim 10 to recite “one or more conjugates,” thus providing antecedent basis for this limitation in claims 37, 38, 95, and 96.

Claims 39, 40, and 97 were rejected because they recite the limitation “the labeled analogue,” and the Examiner alleged it was not clear if “the labeled analogue” referred to the labeled analyte or to some other labeled compound. Applicants have amended claim 39 to clarify that the analyte labeled by a detectable marker forms a labeled analyte and that an analogue of the analyte labeled by a detectable marker forms a labeled analogue. Claims 40 and 97, which depend from claim 39, are thereby made definite.

With the above-described amendments, Applicants respectfully assert that claims 37–40 and 95–97 should be found to comply with the requirements of 35 U.S.C. § 112, second paragraph.

III. Claim rejections under 35 U.S.C. § 102(b) as being anticipated by Kawabata et al. (EP 1376126A1) as evidenced by Walston et al. (US 2001/0055591)

Claims 1–3, 6, 9–29, 33, 35–44, 51–55, 59–65, 67–78, 81, 83, 85, 86, 90, and 92–100 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Kawabata et al. (EP 1376126A1) as evidenced by Walston et al. (US 2001/0055591). This rejection is respectfully traversed. “[F]or anticipation under 35 U.S.C. § 102, a single reference must teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present.” MPEP § 706.02. “The identical invention must be shown in as complete detail as is contained in the . . . claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, USPQ2d 1913, 1920 (Fed. Cir. 1989).

With regard to independent claims 1, 39, and 42, at a minimum, Kawabata et al. do not teach “providing a microfluidic device having a separation channel filled with a separation media and a charged polymer” and performing a separation step in this filled separation channel. The limitation in quotation marks has been added to claims 1, 39, and 42 to clarify that the claimed separation channel is filled with a separation media and a charged polymer before it is used for a separation step. Support for the limitation can be found throughout the specification, for example, on page 16, lines 32 and 33; on page 17, line 34, through page 18, line 1; on page 40, lines 21–29; and in original claim 30. Thus, no new matter has been added by the amendment.

As the Examiner has observed on page 15 of the current Office action, the separation channel of Kawabata et al. is not filled with a separation media and a charged polymer prior to introducing a sample for separation. Rather, the separation channel contains a charged polymer only after heparin is introduced into the channel along with the sample.

With regard to claims 51 and 93, at a minimum, Kawabata et al. do not teach “providing a microfluidic device having a concentration channel filled with a concentration media and a charged polymer” and performing a concentration step in this filled concentration channel. The limitation in quotation marks has been added to claims 51 and 93 to clarify that the claimed concentration channel is filled with a concentration media and a charged polymer before it is used for a concentration step. Support for the limitation can be found, for example, on page 65, lines 29–34, and on page 73, line 33. Thus, no new matter has been added by the amendment.

On page 15 of the current Office action, the Examiner states that Kawabata et al. teach adding a charged polymer to a solution that is flowed through a separation channel. The same solution is flowed through a “first capillary” prior to introduction of the solution into a second capillary for separation. In the Office action dated July 24, 2006, the Examiner identified this “first capillary” as a concentration channel. In paragraph 0056 on page 12, Kawabata et al. state that a “buffer for migration (electrophoresis) is packed in” the first capillary. Kawabata et al. are silent with regard to a capillary that is filled prior to use with both a concentration medium and a charged polymer.

Thus, Kawabata et al. do not teach every aspect of the claimed invention either explicitly or impliedly, nor do they show the identical invention claimed by Applicants in as complete detail as is contained in independent claims 1, 39, 42, 51, and 93. Withdrawal of the rejection of amended independent claims 1, 39, 42, 51, and 93 under 35 U.S.C. § 102(b) as being anticipated by Kawabata et al. is, therefore, respectfully requested.

Claims 2, 3, 6, 9–29, 33, 35–38, 43, and 44 depend directly or indirectly from amended independent claim 1; claims 40 and 41 depend directly from amended independent claim 39; and claims 53, 55, 59–65, 67–78, 81, 83, 85, 86, 90, and 92 depend directly or indirectly from amended independent claim 51. Applicants respectfully submit that claims 2, 3, 6, 9–29, 33, 35–38, 40, 41, 43, 44, 53, 55, 59–65, 67–78, 81, 83, 85, 86, 90, and 92 are allowable for at least the same reasons as set forth herein with respect to amended independent claims 1, 39, and 51. Withdrawal of the rejection of these claims under 35 U.S.C. § 102(b) as anticipated by Kawabata et al. is also respectfully requested. Claims 52 and 54 were previously canceled.

The Walston et al. reference was cited on page 6 of the Office action dated July 24, 2006, for the sole purpose of providing evidence that “heparin is a polysaccharide with a strong negative charge.” The Examiner did not allege that Walston et al. teach regarding a separation channel in a microfluidic device that is filled with a separation media and a charged polymer, nor does the reference provide this teaching.

IV. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Kawabata et al. (EP 1376126A1) in view of Bickel et al. (Proc. Natl. Acad. Sci.)

Claims 4, 8, 79, and 84 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kawabata et al. (EP 1376126A1) in view of Bickel et al. (Proc. Natl. Acad. Sci., Vol. 89, pp. 10001–10005, November 1992). The rejection of these claims is respectfully traversed.

To warrant rejection under 35 U.S.C. § 103(a), all the claim limitations must be taught or suggested by the prior art. *See* MPEP § 2142. As demonstrated above, Kawabata et al. neither teach nor suggest all of the limitations of Applicants’ amended independent claims 1 and 51, from which claims 4, 8, 79, and 84 depend. Thus, claims 1 and 51 are nonobvious over the Kawabata et al. reference.

Bickel et al. do not teach a separation channel in a microfluidic device filled with a separation media and a charged polymer prior to introduction of a sample for separation, the feature demonstrated above to be absent from the teachings of Kawabata et al. Bickel et al. teach adding heparin sulfate (a charged polymer) to protein extracts in a binding buffer, this buffer mixture then being loaded onto a standard polyacrylamide gel for electrophoretic separation. *See* the first column of page 10002. Therefore, Applicants' amended independent claims 1 and 51 are nonobvious over the combination of Kawabata et al. and Bickel et al.

Claims 4 and 8 depend directly and indirectly, respectively, from amended independent claim 1, while claims 79 and 84 depend indirectly from amended independent claim 51. Any claim depending from a nonobvious claim is also nonobvious. *See* MPEP § 2143.03 and *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Therefore, dependent claims 4, 8, 79, and 84 are nonobvious. Withdrawal of the rejection of these claims over Kawabata et al. in view of Bickel et al. is, therefore, respectfully requested.

V. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Kawabata et al. (EP 1376126A1) in view of Stathakis et al. (Journal of Chromatography)

Claims 30–32 and 87–89 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kawabata et al. (EP 1376126A1) in view of Stathakis et al. (Journal of Chromatography A, Vol. 817, pp. 227–232, 1998). The rejection of these claims is respectfully traversed.

As demonstrated above, claims 1 and 51, from which claims 31, 32, and 87–89 depend, are nonobvious over Kawabata et al. Stathakis et al. do not teach a separation or a concentration channel in a microfluidic device filled with a separation/concentration media and a charged polymer prior to introduction of a sample for separation/concentration, the features demonstrated above to be absent from the teachings of Kawabata et al. At most, Stathakis et al. teach adsorbing a charged polymer, i.e., dextran sulfate or poly(vinyl sulphonic acid), to a capillary wall, thereby minimizing protein-wall interactions during electrophoretic separation of proteins in food samples. As is made clear in section 2.2, in the second column of page 228, the capillary contains no separation or concentration media and is not filled with a charged polymer, the polymer being adsorbed to the inner wall of the capillary. Thus, Applicants' amended

independent claims 1 and 51 are nonobvious over the combination of Kawabata et al. and Stathakis et al.

Claims 31 and 32 depend directly from amended independent claim 1, while claims 87–89 depend indirectly from amended independent claim 51. As any claim depending from a nonobvious claim is also nonobvious, dependent claims 31, 32, and 87–89 are nonobvious. Withdrawal of the rejection of these claims over Kawabata et al. in view of Stathakis et al. is, therefore, respectfully requested. Claim 30 was previously canceled.

VI. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Kawabata et al. (EP 1376126A1) in view of Stalcup et al. (Analytic Chemistry)

Claims 34 and 91 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kawabata et al. (EP 1376126A1) in view of Stalcup et al. (Analytic Chemistry, Vol. 66, pp. 3054–3059, 1994). The rejection of these claims is respectfully traversed.

As demonstrated above, claims 1 and 51, from which claims 34 and 91 depend, are nonobvious over Kawabata et al. Stalcup et al. do not teach a separation/concentration channel in a microfluidic device filled with a separation/concentration media and a charged polymer prior to introduction of a sample for separation/concentration, the features demonstrated above to be absent from the teachings of Kawabata et al. At most, Stalcup et al. teach 2% heparin in a phosphate run buffer used for capillary zone electrophoresis. The capillary contains no separation or concentration media, per the “Apparatus” section in column 2 of page 3054. Thus, Applicants’ amended independent claims 1 and 51 are nonobvious over the combination of Kawabata et al. and Stalcup et al.

Claim 34 depends indirectly from amended independent claim 1, while claim 91 depends indirectly from amended independent claim 51. As any claim depending from a nonobvious claim is also nonobvious, dependent claims 34 and 91 are nonobvious. Withdrawal of the rejection of these claims as unpatentable over Kawabata et al. in view of Stalcup et al. is, therefore, respectfully requested.

VII. Claim rejection under 35 U.S.C. § 103(a) as being unpatentable over Kawabata et al. (EP 1376126A1) in view of Fukui et al. (Nucleic Acids Research)

Claim 66 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kawabata et al. (EP 1376126A1) in view of Fukui et al. (Nucleic Acids Research, Vol. 24, No. 20, pp. 3962–3967, 1996). The rejection of this claim is respectfully traversed.

As demonstrated above, claim 51, from which claim 66 depends, is nonobvious over Kawabata et al. Fukui et al. do not teach a concentration channel in a microfluidic device that is filled with a concentration media and a charged polymer prior to introduction of a sample for concentration, the feature shown above to be missing from the teachings of Kawabata et al. At the bottom of page 3962, continuing on to the top of page 3963, Fukui et al. teach a high performance liquid chromatography (HPLC) method carried out using a COSMOSIL AR-300 column (4.6 x 150 mm). Thus, Fukui et al. do not teach a concentration channel in a microfluidic device or a charged polymer that, along with a concentration medium, fills such a concentration channel. Therefore, Applicants' amended independent claim 51 is nonobvious over the combination of Kawabata et al. and Fukui et al.

Claim 66 depends indirectly from amended independent claim 51. As any claim depending from a nonobvious claim is also nonobvious, dependent claim 66 is nonobvious. Withdrawal of the rejection of claim 66 as unpatentable over Kawabata et al. in view of Fukui et al. is, therefore, respectfully requested.

VIII. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Kawabata et al. (EP 1376126A1) in view of Kaniansky et al. (Analytical Chemistry)

Claims 57 and 58 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kawabata et al. (EP 1376126A1) in view of Kaniansky et al. (Analytic Chemistry, Vol. 72, pp. 3596–3604, 2000). The rejection of these claims is respectfully traversed.

As demonstrated above, claim 51, from which claims 56 and 57 depend, is nonobvious over Kawabata et al. Kaniansky et al. do not teach a concentration channel in a microfluidic device that is filled with a concentration media and a charged polymer prior to introduction of a sample for concentration, the feature shown above to be missing from the

teachings of Kawabata et al. Kaniansky et al. do not teach regarding a concentration channel. Further, Table 1 in the first column of page 3599, which provides detailed compositions of the electrolyte solutions employed in the capillary electrophoresis experiments, does not show both a concentration media and a charged polymer. Therefore, Applicants' amended independent claim 51 is nonobvious over the combination of Kawabata et al. and Kaniansky et al.

Claims 57 and 58 depend directly from amended independent claim 51. As any claim depending from a nonobvious claim is also nonobvious, dependent claims 57 and 58 are nonobvious. Withdrawal of the rejection of claims 57 and 58 as being unpatentable over Kawabata et al. in view of Kaniansky et al. is, therefore, respectfully requested.

IX. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Kawabata et al. (EP 1376126A1) in view of Wolfe et al. (Electrophoresis)

Claims 56 and 57 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Kawabata et al. (EP 1376126A1) in view of Wolfe et al. (Electrophoresis, Vol. 23, pp. 727–733, 2002). The rejection of these claims is respectfully traversed.

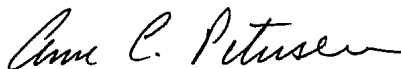
As demonstrated above, claim 51, from which claims 56 and 57 depend, is nonobvious over Kawabata et al. Wolfe et al. do not teach a concentration channel in a microfluidic device that is filled with a concentration media and a charged polymer prior to introduction of a sample for concentration, the feature shown above to be missing from the teachings of Kawabata et al. Wolfe et al. do not teach regarding a concentration channel. The abstract describes a procedure in which DNA is adsorbed onto bare silica. Contaminants are removed, and the adsorbed DNA is eluted in a small volume of buffer. The DNA is then subjected to PCR amplification. While this could be considered a concentration step, it is not carried out in a channel, nor is there either a concentration media or a charged polymer present. Therefore, Applicants' amended independent claim 51 is nonobvious over the combination of Kawabata et al. and Wolfe et al.

Claims 56 and 57 depend directly from amended independent claim 51. As any claim depending from a nonobvious claim is also nonobvious, dependent claims 56 and 57 are nonobvious. Withdrawal of the rejection of claims 56 and 57 as being unpatentable over Kawabata et al. in view of Wolfe et al. is, therefore, respectfully requested.

Conclusion

For the foregoing reasons, Applicants believe all the pending claims are in condition for allowance and should be passed to issue. If the Examiner feels that a telephone conference would in any way expedite the prosecution of the application, please do not hesitate to call the undersigned attorney.

Respectfully submitted,



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